Modeling Energy Developmental and Environment Impacts with Emphasis on Natural Gas Extraction

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Number of students: 1-2
Develop simplified educational mathematical simulation models to allow exploration of how energy development scenarios affect temporal-spatial patterns in selected Earth systems variables such as carbon dioxide and methane emissions, transport and distribution of chemical solutes, and abundance and biodiversity of organisms in the region where energy is developed. Will involve creating simulation models based on systems dynamics or other software that can be used to learn about the approximate impacts of different energy extraction scenarios on the environment and economics. The project will focus on impacts of extraction of natural gas through hydraulic fracturing, contrasting a variety of gas extraction scenarios, such as density of drilling, rate of extraction and use, water use and treatment, and habitat disturbance. The models may be later coupled with models that simulate socioeconomic impacts and/or adapted to simulating impacts of other forms of energy development.